

*Project Management Challenge*  
*- 2007 -*

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*Quality*

*Project Management Challenge*  
*- 2007 -*

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*Quality*  
*Assurance*

*Project Management Challenge*  
*- 2007 -*

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*Government Contract*  
*Quality Assurance*  
*for NASA Projects*



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# Video



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NASA missions cannot succeed  
if requirements are not complied with



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NASA personnel are not safe  
if requirements are not complied with

# *Quality Assurance*

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Discipline to assure that  
requirements are complied with

**Technical Requirements**  
**Safety Requirements**  
**Quality Requirements**



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Quality is never an accident; it is always the result of high intention, sincere effort, intelligent direction and skillful execution; it represents the wise choice of many alternatives.

William A. Foster 8

# Quality Roadmap



Establish and Document Requirements



Assure Compliance with Requirements  
(Technical/Safety/Quality)



Organization  
Performing Work

Government  
(Contracting Agent)

Quality System Requirements  
AS9100

Government Contract Quality Assurance  
NPR 8735.2

Prevention

Detection/  
Correction

Prevention

Detection/  
Correction



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Government Contract Quality Assurance  
is not optional.

# Government Contract Quality Assurance



## Authority

Federal Acquisition Regulations (FAR) Part 46, Quality Assurance

- Contract quality requirements: Requirements in the contract relating to the quality of the product and those contract clauses prescribing inspection, and other quality controls incumbent on the contractor, to assure that the product conforms to the contractual requirements.
- Government contract quality assurance: The various functions, including inspection, performed by the Government to determine whether a contractor has fulfilled the contract obligations.
- The Government is required to perform “all actions necessary” to verify whether supplies conform to contract quality requirements.
- The extent of quality assurance is based upon the complexity and criticality of the contract item.

# ***NPR 8735.2 Overview***



- Government contract quality assurance refers to the various functions performed by the Government to determine whether a contractor has fulfilled contract obligations.
- Government contract quality assurance is provided in addition to, not as a substitute for, contractor responsibilities for assuring delivery of conforming product or services.
- NASA may perform Government contract quality assurance functions directly, or may delegate these functions to non-NASA Federal agencies or support contractors.
- Government contract quality assurance functions are performed on the basis of contract ?.



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# Risk



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It is NASA policy to mitigate risks associated with noncompliance.

NPD 8730.5

**Determination of risk considers:**

- **the likelihood of noncompliance**
- **the consequences associated with noncompliance**
- **the maturity, complexity, criticality, importance & the value of work performed**
- **past performance**



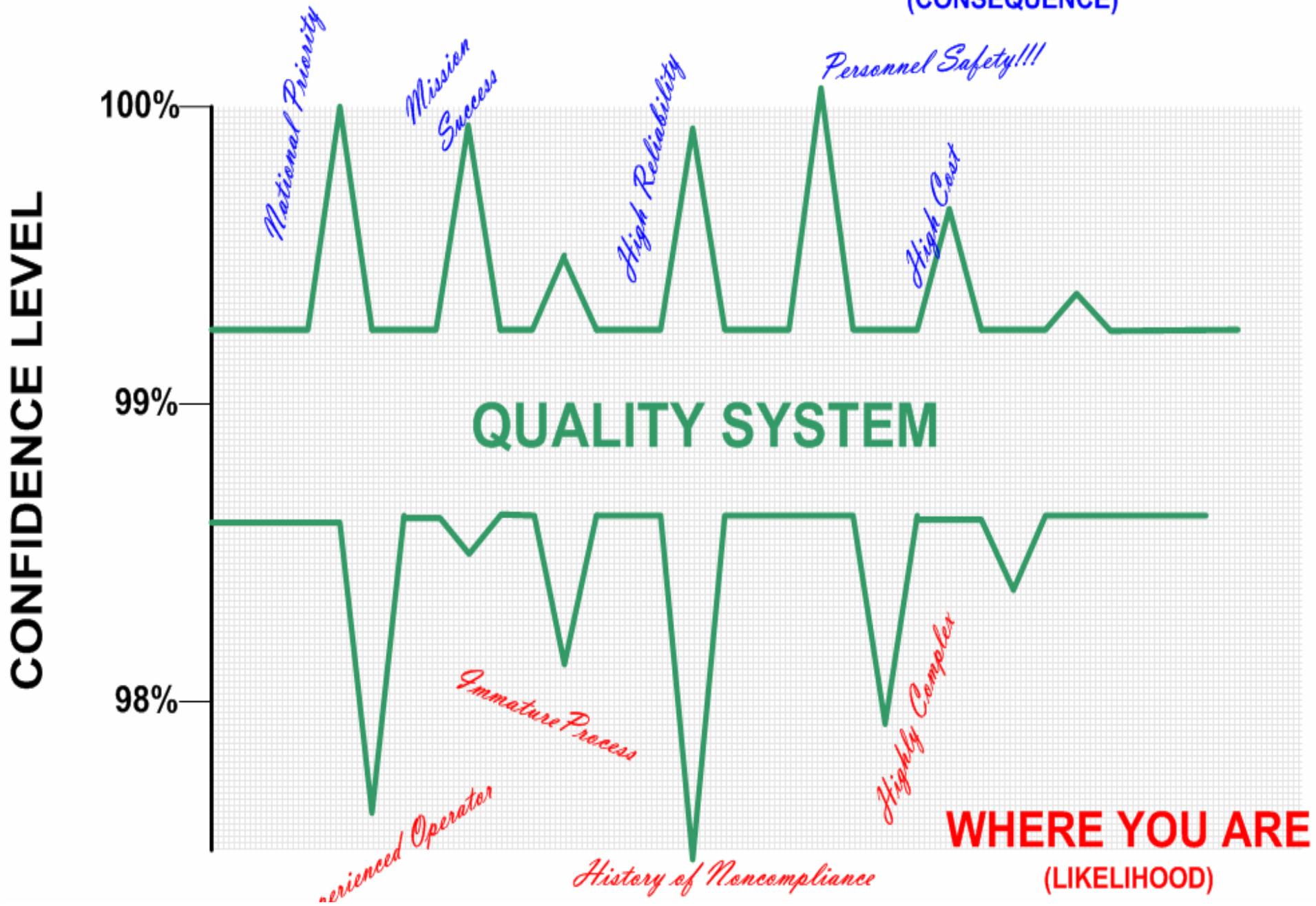
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The quality system provides assurance that all requirements are complied with- those that matter a lot and those that don't matter much. For highly complex and critical operations, there are MANY requirements that matter a lot.

**NASA = HIGHLY CRITICAL AND COMPLEX**

Don't waste your time assuring requirements that don't matter much. Be deliberate, be watchful, be smart. Careful planning and measurement of risk is the inviolable first step before quality program execution.

# WHERE YOU NEED TO BE (CONSEQUENCE)





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“There are jobs in the world where the calls don’t have much consequence. Nobody in this Agency has one of those inconsequential jobs.”

“Behind every decision, everyone knows that we have neither the time nor the resources to do anything that is not absolutely critical... We have no time for fluff.”

**Wayne Hale**  
**Johnson Space Center**  
**Space Shuttle Entry Flight Director**  
**October 26, 2004**

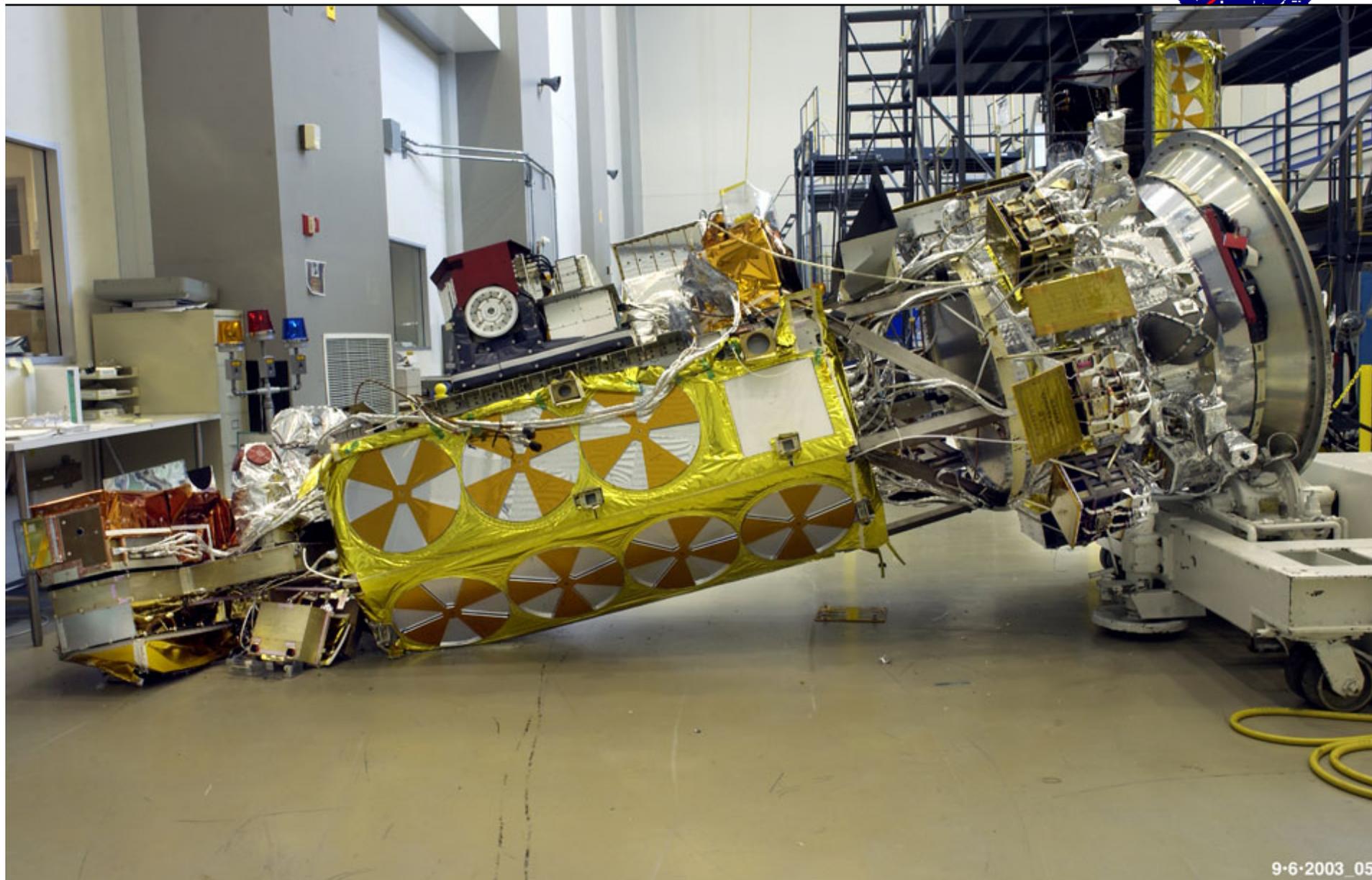


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Separate the vital few from the trivial many.

Joseph Juran

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9-6-2003\_05

# *Categorization of Acquisition Items*



## **Low Risk**

- Non-Critical
- Satisfactory likelihood of success
- Acceptable failure consequences
  - Personnel Safety
  - Product Cost
  - Product Importance to Mission
  - Mission Importance
  - 7120.5 Project Categorization

## **High Risk**

- Complex
- Critical
- Unsatisfactory likelihood
- Unacceptable consequences
  - Personnel Safety
  - Product Cost
  - Product Importance to Mission
  - Mission Importance
  - 7120.5 Project Categorization

# *Scope of Government Contract Quality Assurance*



## Low-Risk Acquisitions

- FAR/NASA FAR Supplement
- Quality Standard
- GMIPs
- Final Product Acceptance

## High-Risk Acquisitions

### Project QA Surveillance Plan

#### Quality Program Elements:

- Document Review
- Product Assurance
- Quality System Evaluation
- Quality Data Analysis
- Nonconformance Reporting/C. Action
- Final Product Acceptance

# *Project Quality Assurance Surveillance Plan (PQASP)*



- Single integrated document consolidating all QA requirements (FAR, NSF, 8730.5, 8735.2)
- Periodically adjusted based on changing risk
- Identifies **specific**:
  - product examinations
  - processes to be witnessed
  - records to be reviewed
  - quality system elements to be audited
  - GMIPS
  - sampling plans

# ***PQASP Elements***

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- Document Review
- Product Assurance
- Quality System Evaluation
- Quality Data Analysis
- Nonconformance Reporting and Corrective/Preventive Action
- Final Acceptance

# *Document Review*

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- Contractor quality system procedures, technical products (e.g., data, drawings), and manufacturing process instructions shall be reviewed to ensure compliance with contract requirements.
- Document review shall be performed on a periodic basis and whenever document changes are made that affect quality system processes or product attributes.
- Selection of documents for review shall be based on the criticality, complexity, cost and importance of the product or process that is documented, and past product/process performance.

# *Product Assurance*

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- 1) Product Examination
- 2) Process Witnessing
- 3) Record Review

The selection of product assurance actions and the sample size/frequency of attribute selection shall be based on: 1) the criticality, complexity, cost, and importance of product supplied, 2) the complexity and maturity of the Process performed, 3) personnel safety considerations, and 4) the supplier's past quality performance related to the product supplied or process performed.

# *Product Assurance*

## *- Product Examination -*

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Supplier products shall be physically inspected, measured, or tested to ensure conformity to contract requirements

# *Product Assurance - Process Witnessing -*

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Supplier work processes shall be personally witnessed to ensure compliance with prescribed work instructions and contract requirements.

# *Product Assurance - Record Review -*

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Recorded evidence demonstrating conformance to contract requirements shall be reviewed to ensure product and process conformance to contract requirements.

# Quality System Evaluation



**The following quality elements shall be reviewed at least once every two years:**

- Control of documents.
- Control of records
- Configuration management.
- Personnel training, qualifications, and competence.
- Design and development control.
- Purchasing: Supplier evaluation/selection; purchasing information and flow-down of technical/quality requirements; verification of purchased product.
- Production control and process control.
- Product identification, traceability, and identification of inspection/test status.
- Preservation of product; foreign object prevention, detection, and removal.
- Calibration and control of monitoring, measuring, and test devices.
- Monitoring and measurement: Internal audit; monitoring and measurement of processes; monitoring and measurement of product.
- Control of nonconforming product.
- Quality data analysis/trending.
- Corrective action.
- Control of Government Furnished Property.

# Quality Data Analysis

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- 2.6.1 Contractor quality data shall be collected and analyzed to identify problem areas (e.g., projects, products, processes, operations, organizations), common deficiency causes, quality trends, defect anomalies, and process variations.
- 2.6.2 Sources of data shall include contractor-generated metrics, NASA-identified nonconformances, post-delivery quality escapes, and quality data reported by delegated parties (e.g., DCMA, quality assurance support contractors, and accredited quality system registrars).
- 2.6.3 Data shall be evaluated at established periodic intervals for the purpose of:
- a. Adjusting the frequency and content of customer oversight actions, including allocation of quality assurance personnel resources.
  - b. Providing supporting rationale for acceptance/rejection of the contractor's quality system and/or written procedures.
  - c. Initiating corrective action based on identification of systemic problems and trends.
  - d. Sharing analysis with the contractor to identify quality system trends and areas of weakness.

# *Nonconformance Reporting and Corrective/Preventive Action*

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- Corrective action requests shall be elevated to the appropriate level of contractor management based on problem criticality, recurrence, and/or nonresponsiveness.
- Corrective action requests shall require identification of:
  - The root cause(s)
  - The scope of the nonconformance
  - Remedial corrective actions taken
  - Measures to prevent recurrence
- Government follow-up shall be performed to ensure effective accomplishment of contractor corrective/preventive actions. Government follow-up may consist of first hand observations or review of verifiable contractor submitted documentation.

# *Final Acceptance*

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- Final acceptance constitutes acknowledgement that the supplies or services conform with applicable contract quality and quantity requirements:
  - Final product inspection.
  - Validation that there are no outstanding corrective actions affecting acceptability of product.
  - Validation that there are no outstanding engineering waivers/deviations impacting acceptability of product, and that all applicable engineering departures/waivers/deviations have been approved by the proper technical authority.
  - Validation that all required GMIPs have been accomplished.
- Performance of final acceptance is an **inherently Governmental function** which is the responsibility of the NASA contracting officer or his/her Government delegate. Performance of final acceptance shall not be delegated to a non-Governmental entity (Requirement).

# Government Mandatory Inspection Points (GMIPs)



<h2>Safety Critical</h2> <ul style="list-style-type: none"><li>- loss of life -</li></ul> <p><b>Most severe consequence</b></p> <ul style="list-style-type: none"><li>- Mandatory</li><li>- 100% (no sampling)</li></ul>	<h2>Mission Critical</h2> <ul style="list-style-type: none"><li>- loss of mission -</li><li>- serious personnel injury -</li><li>- loss of significant resource -</li></ul> <p><b>Highly severe consequence</b></p> <ul style="list-style-type: none"><li>- Heightened confidence</li><li>- Sampling</li></ul>	<h2>Key Requirements</h2> <ul style="list-style-type: none"><li>- Product Attributes -</li><li>- Process Attributes -</li></ul> <p><b>Moderately severe consequence and elevated likelihood</b></p> <ul style="list-style-type: none"><li>- Discretionary assignment</li></ul>
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# *GMIP Requirements*

## *- General -*

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- Timing
  - Late as practicable / early as practicable
  - After contractor acceptance
  - Sub-contractor facilities only when necessary
- Personal Warranty
  - A signed a statement indicating understanding that his/her stamp or signature is a professional individual warranty that they personally examined the product as literally stated.
- Positive (closed loop) accounting method

# *Safety Critical GMIPs*

## *- Special Provisions -*

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- Performed by, or under the supervision of, Governmental personnel, including periodic spot checks and other measures to ensure competency
- Product examination or process witnessing vs record review
- Express prohibition against continued work operations

# *Third Party Certification/Accreditation*



The following certification/registration bodies and accreditation programs are authorized to perform Government contract quality assurance functions for NASA contracts:

- AS9100 certification/registration bodies accredited in accordance with AS9104.
- Nadcap accreditation program in accordance with AS7003.
- ISO 9001 certification/registration bodies accredited in accordance with ISO Guide 61.

# Letter of Delegation Template



- Standardized text
- Menu format
- Mandatory and discretionary requirements
- Selection of discretionary requirements based on contract risk

## NPR 8735.2 Appendix C Excerpt:

- (2) Product Assurance: The delegated agency shall assure product quality by product examination, process evaluation, and record review as follows:
  - (a) Product Examination: Supplier products shall be physically inspected, measured, or tested to ensure conformity to contract requirements.
  - (b) Process Evaluation: Supplier processes for manufacturing, fabrication, assembly, integration, test, and inspection shall be physically witnessed to ensure compliance with contract requirements.
  - (c) Record Review: Supplier records evidencing conformance to contract requirements shall be reviewed to ensure product and process conformance to contract requirements.